IN THE CLAIMS

Please amend the claims as follows:

1. (Previously Presented) A device comprising means for storing instructions, said instructions adapted to be executed by a processor of a computer, said instructions when executed by the processor executing a process comprising the steps of

(a) obtaining a first data set, the first data set comprising:

time history of fluid volumes,

time history of proppant volumes,

fluid properties,

proppant properties if the fluid contains proppant, and

geological properties of a layered reservoir, including layer interface locations, each layer being characterized by an unsolved equilibrium equation;

(b) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having electronic storage means with stored equations comprising hydraulic fracturing relationships,

(c) computing by said processor a first set of values by manipulating said first data set using said stored equations, said manipulation including solving the equilibrium equations for each layers by the use of a Fourier Transform method whereby the relations between stress and strain in the layered reservoir are determined,

(d) determining from said first set of values dimensions of a hydraulic fracture, the dimensions including fracture height and length, fracture width and fluid pressures as a function of time, said hydraulic fracture intersecting at least one layer interface,

(e) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time,

(f) displaying the output data on a computer monitor.

2. (Original) The device of claim 1 further wherein the step of determining from said first set of values dimensions of a hydraulic fracture is achieved using a mesh of elements.

3. (Previously Presented) A device comprising means for storing instructions, said instructions adapted to be executed by a processor of a computer, said instructions when executed by the processor executing a process comprising the steps of

(a) obtaining a first data set, the first data set comprising:

time history of fluid volumes,

time history of proppant volumes,

fluid properties,

proppant properties if the fluid contains proppant, and

geological properties of a layered reservoir, including layer interface locations, each layer being characterized by an unsolved equilibrium equation;

(b) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having electronic storage means with stored equations comprising hydraulic fracturing relationships,

(c) computing by said processor a first set of values by manipulating said first data set using said stored equations, said manipulation including solving the equilibrium equations for each layers by the use of a Fourier Transform method whereby the relations between stress and strain in the layered reservoir are determined,

(d) determining using a mesh of elements from said first set of values dimensions of a hydraulic fracture, the dimensions including fracture height and length, fracture width and fluid pressures as

a function of time, said hydraulic fracture intersecting at least one layer interface, and wherein the elements may be only partially active,

(e) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time,

(f) displaying the output data on a computer monitor.

4. (Original) The device of claim 2 further wherein during the determining step recalculation of fully active elements is not required during determination of said first set of values.

5. (Canceled).

6. (Previously Presented) A device comprising means for storing instructions, said instructions adapted to be executed by a processor of a computer, said instructions when executed by the processor executing a process comprising the steps of

(a) obtaining a first data set, the first data set comprising:

time history of fluid volumes for pumping,

time history of proppant volumes for pumping,

fluid properties,

proppant properties if the fluid contains proppant, and

logs of geological information,

(b) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having electronic storage means with stored equations comprising hydraulic fracturing relationships,

(c) computing by said processor a first set of values by manipulating said first data set using said stored equations,

(d) determining from said first set of values the dimensions of a hydraulic fracture using a mesh of elements, said dimensions including fracture height and length, fracture width and fluid pressures as a function of time, wherein the elements are capable of being only partially active, further wherein ~~the~~ recalculation of fully active elements is not required during determination of said first set of values,

(e) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time,

(f) displaying, transmitting, or printing the output data.

7. (Previously Presented) A method of designing a hydraulic fracture of a well, comprising:

(a) obtaining a first data set, the first data set comprising:

time history of fluid volumes for pumping,

time history of proppant volumes for pumping,

fluid properties,

proppant properties if the fluid contains proppant, and

logs,

(b) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having electronic storage means with stored equations comprising hydraulic fracturing relationships,

(c) computing by said processor a first set of values by manipulating said first data set using said stored equations,

(d) determining from said first set of values the dimensions of a hydraulic fracture using a mesh of elements, said dimensions including fracture height and length, fracture width and fluid pressures as a function of time, wherein the elements are capable of being only partially active, further wherein ~~the~~ recalculation of fully active elements is not required during determination of said first set of values,

(e) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time,

(f) displaying the output data.

8. (Currently Amended) A method for monitoring or evaluating the fracture of a well, comprising:

(a) pumping a fracturing fluid into a wellbore,

(b) obtaining a first data set, the first data set comprising ~~one or more of~~ the following:

time history of fluid volumes for pumping,

~~time history of proppant volumes for pumping,~~

fluid properties,

~~proppant properties if the fluid contains proppant,~~ and

logs,

(c) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having electronic storage means with stored equations comprising hydraulic fracturing relationships,

(d) computing by said processor a first set of values by manipulating said first data set using said stored equations,

(e) determining from said first set of values the dimensions of a hydraulic fracture using a mesh of elements, said dimensions including fracture dimensions and fluid pressures as a function of time, wherein the elements are capable of being only partially active, further wherein the recalculation of fully active elements is not required during determination of said first set of values,

(f) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time,

(g) displaying the output data, and

(h) monitoring the pumping step (a) to determine fracturing performance ~~in real time~~.

9. (Currently Amended) A method of evaluating the fracture of a well following a fracturing operation, comprising:

(a) fracturing a well,

(b) obtaining a first data set, the first data set comprising ~~one or more of~~ the following data points obtained during step (a):

time history of fluid volumes for pumping,

~~time history of proppant volumes for pumping,~~

fluid properties,

~~proppant properties if the fluid contains proppant,~~ and

logs,

(c) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having electronic storage means with stored equations comprising hydraulic fracturing relationships,

(d) computing by said processor a first set of values by manipulating said first data set using said stored equations,

(e) determining from said first set of values the dimensions of a hydraulic fracture using a mesh of elements, said dimensions including fracture dimensions and fluid pressures as a function of time, wherein the elements are capable of being only partially active, further wherein the recalculation of fully active elements is not required during determination of said first set of values,

(f) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time,

(g) displaying the output data.

10. (Original) An article of manufacture, comprising:

(a) magnetic storage means having encoded thereon instructions,

(b) a computer, the computer having a processor, wherein the processor is operably connected to said magnetic storage means,

(c) wherein data is provided representing the time history of fluid volumes, fluid properties, and proppant properties required to fracture a reservoir of a reservoir,

(d) the processor being adapted to calculate values that correlate to said data, the values representing physical properties related to the reservoir or well fracturing operations using fluids, the values being used to estimate fracturing fluid performance,

(e) the processor being capable of processing such data using numerical methods that subdivide a fracture numerical mesh into elements for purposes of calculation, said elements being generally capable of adopting a status as fully active, partially active, or inactive for calculation purposes, further wherein recalculation of fully active elements is not required.

11. (Canceled).

12. (Previously Presented) A system adapted to process data to optimize the placement of a fracture in a subterranean formation, comprising:

(a) obtaining a first data set, the first data set comprising:

time history of fluid volumes for pumping,

time history of proppant volumes for pumping,

fluid properties,

proppant properties if the fluid contains proppant, and

logs identifying geological zones in a reservoir,

(b) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having electronic storage means with stored equations comprising hydraulic fracturing relationships,

(c) computing by said processor a first set of values by manipulating said first data set using said stored equations,

(d) determining from said first set of values the dimensions of a hydraulic fracture using a mesh of elements, said dimensions including fracture dimensions and fluid pressures as a function of time, wherein the elements are capable of being only partially active, further wherein ~~the~~ recalculation of fully active elements is not required during determination of said first set of values,

(e) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time, and

(f) displaying the output data.

13. (Previously amended) A method comprising:

(a) obtaining a first data set,

(b) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having electronic storage means with stored equations

comprising hydraulic fracturing relationships, the relationships comprising a Fourier Transform solution of multilayer equilibrium equations, the solution employing at least one inversion process,

(c) computing by said processor a first set of values by manipulating said first data set using said stored equations, the equations including a Green's function or influence matrix,

(d) determining the dimensions of a hydraulic fracture intersecting several layers using a mesh of elements,

(e) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time.

14. (Original) The method of claim 13 further comprising the step of: (f) displaying the data for a user.

15. (Original) The method of claim 13 further comprising the step of: (f) sending the data to a remote site by way of a transmission medium.

16. (Original) The method of claim 13 further comprising the step of: (f) printing the output data.

17. (Previously Amended) A device comprising a pre-recorded means readable by a computer and carrying instructions for a process, the instructions comprising the steps of:

(a) obtaining a first data set,

(b) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having pre-recorded means with stored equations comprising hydraulic fracturing relationships, the relationships comprising a Fourier Transform solution of multilayer equilibrium equations, the solution employing at least one inversion process,

(c) computing by said processor a first set of values by manipulating said first data set using said stored equations, the equations including a Green's function or influence matrix,

(d) determining the dimensions of a hydraulic fracture intersecting several layers using a mesh of elements, and

(e) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time.

18. (Original) The device of claim 17, wherein said pre-recorded means is selected from the group of magnetic tape, a magnetic disk, an optical disk, a CD-ROM.

19. (Previously Amended) A report generated by illustrating a characteristic or set of values for a fracturing operation of a formation penetrated by a wellbore, said formation having a reservoir of oil or gas, comprising the steps of:

(a) obtaining a first data set,

(b) providing the first data set to a computer, the computer having a processor capable of executing instructions, the computer further having pre-recorded means with stored equations comprising hydraulic fracturing relationships, the relationships comprising a Fourier Transform solution of multilayer equilibrium equations, the solution employing at least one inversion process,

(c) computing by said processor a first set of values by manipulating said first data set using said stored equations, the equations including a Green's function or influence matrix,

(d) determining the dimensions of a hydraulic fracture intersecting several layers using a mesh of elements,

(e) converting said first set of values into a set of output data, the output data representing fracture dimensions and pressures as a function of pumping time, and

(f) generating a report.

20. (Canceled).